

### Abstract of the Disclosure

A method of removing hydrogen sulfide from an emissions stream is disclosed, wherein the method includes directing the emissions stream into a hydrogen sulfide converter having a metal oxide catalyst, adsorbing the hydrogen sulfide in the emissions stream to the metal oxide catalyst in the hydrogen sulfide converter, reacting the hydrogen sulfide with at least one of an oxidant and a reductant in the hydrogen sulfide converter to chemically transform the hydrogen sulfide, and adjusting an air-fuel ratio of the emissions stream based on exhaust temperature of an emission control device, where said adjustment varies a duration of at least one of lean and rich operation to perform said adsorbing and reacting even as exhaust temperature varies.